



Diamond Head State Monument

Honolulu, Oāhu, Hawaiʻi

How Was the Crater Formed?

The pronounced seaward summit, deeply eroded ridges, and oval shaped crater are evidence of Lēʻahi's very dynamic geological history. The creation of Oʻahu began around 2.5 to 4 million years ago with volcanic eruptions from 3 volcanoes - Kaʻena, Koʻolau and Waiʻanae. After about 1.3 million years of inactivity, there were fissure eruptions along the Koko Rift on southeastern end of the Koʻolau Range. These eruptions took place under the ocean, where the magma was broken down into ash and fine particles by the water and steam. Blown high into the air, these particles were cemented together with coral and basalt to create tuff cones such as Lēʻahi.



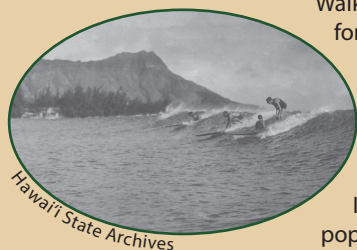
It was an explosive eruption occurring near the coastline in relatively shallow ocean water that created the shallow, saucer shaped crater of Lēʻahi.



Early Hawaiian History

It is said that Hiʻiaka, sister of the fire goddess Pele, gave Lēʻahi its name because the summit resembles the forehead (lae) of the ʻahi fish. Another translation is "fire headland" and refers to the navigational fires that were lit at the summit to assist canoes traveling along the shoreline. The heiau (temple) built on the summit was dedicated to the god of wind as protection against strong updrafts that could put out these navigational fires. Today, the Diamond Head Lighthouse, built in 1917, provides a visual aid for navigation.

In the late 1700s, Western explorers and traders visited Lēʻahi and mistook the calcite crystals in the rocks on the slopes of the crater for diamonds. Thus, the name Diamond Head became the common name for the crater.



Hawaiʻi State Archives

Waikiki was an important residence for the aliʻi (chiefs) of Oʻahu with an abundance of loko iʻa (fishponds), loʻi kalo (taro fields), and groves of coconut trees. It was favored for its long white sand beach, good surfing, and canoe landing sites. In historic times, Waikiki remained a popular retreat for the royal families.

Adapting to a Hot, Dry Environment

Botanists believe that the crater was once covered by a dryland forest, but only a few native Hawaiian species remain, including the low-growing ʻilima. Until the early 1900s, rainwater collected on the crater floor, creating a small lake that was frequented by native ducks and waterbirds. The lake is now gone and the plants and animals have adapted to the hot, dry conditions. Introduced to Hawaiʻi in the mid-1800s, kiawe is a relative of mesquite and is the dominant tree in the crater. The small, brown animal running across the trail is a mongoose brought from India in the 1880s to control rats. You may see some common introduced birds such as the cardinal.

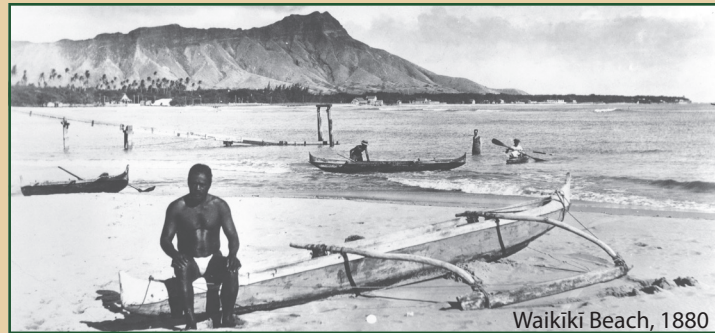


ʻilima



Lēʻahi is believed to have been formed about 300,000 years ago during a single, brief eruption. The broad crater covers 350 acres with its width being greater than its height. The southwestern rim is highest because winds were blowing ash in this direction during the eruption. Since the eruption, the slopes of the crater have been eroded and weathered by rain, wind, and the pounding of the sea. A coral reef now protects the seaward slopes of the crater.

Today, Lēʻahi (Diamond Head) as seen from Waikiki Beach is the most recognized landmark in Hawaiʻi. It was designated a National Natural Landmark in 1968 as an excellent example of a tuff cone. Other tuff cones of the same time are Pūowaina (Punchbowl) and Koko Crater.



Waikiki Beach, 1880

Hawaiʻi State Archives

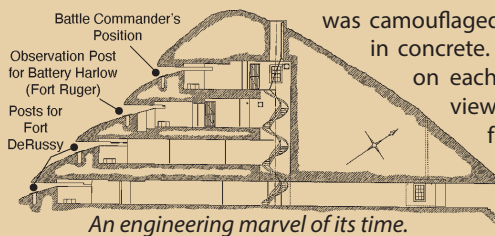
Military History

With its panoramic view from Koko Head to Waiʻanae, the summit of Diamond Head was an ideal site for the coastal defense of Oʻahu. Fire Control Station Diamond Head was built at the summit of the crater between 1908 and 1910. Much of the summit was removed to construct the 4 levels which housed instruments and plotting rooms to direct artillery and mortar fire from Fort DeRussy in Waikiki and Battery Harlow at Fort Ruger. Harlow on the outer slope of the crater had 12-inch mortars that could shoot over the crater if there was an attack from sea. The exterior of the Fire Control Station was camouflaged with rubble embedded in concrete. Slits with metal shutters on each level provided seaward viewing for potential attacks from sea. The 4 levels and the summit were accessed by a spiral staircase and ladders.



Mortars of Battery Harlow, 1910

Hawaiʻi State Archives



Fort Ruger Military Reservation (1906-1950) encompassed the crater and the outer slopes. Kapahulu Tunnel (1908) created access into the crater. Four (4) batteries were built to house the coastal artillery: Harlow (1910) on the inland exterior slope, Dodge and Hulings (1913) tunneled through the eastern crater wall, and Birkhimer (1916) on the crater floor. Long range guns were installed in 1915 on the upper slopes and the rim of the crater. During World War II, the Kahala Tunnel and Battery 407 (1943) were constructed. Diamond Head was prepared to defend Oʻahu but no artillery was ever fired during a war.



STATE OF HAWAII
Department of Land and Natural Resources
Division of State Parks
<http://dlnr.hawaii.gov/dsp/>



Hiking audio tours can be rented at the Gift Shop. Tours are available in multiple languages.

Tips for a Safe and Fun Hike to the Summit of the Crater

The 0.8-mile (1.3km) hike to the summit (one way) climbs to 560 feet (171m) above the crater floor. The trail follows an uneven and vertical terrain with steep stairways and semi-dark tunnels. Use caution and wear appropriate footwear. Allow 1.5 to 2 hours for a safe and leisurely round-trip hike.

Trail Route

Following the numbers on this map, you will make a one-way loop at the summit. This will reduce congestion and enhance viewing at the lookouts.

- The trail is for hiking only. It is not designed for bikes or strollers. Please leave these items at the trailhead.
- There are no restrooms or water available on the trail.



Some Friendly Reminders

- The tunnel gate closes at 6:00pm (1800 hours) and reopens at 6:00am. Do not get locked in!
- Last time to start the hike is 4:00pm.
- The trail is a trash free zone - pack out what you pack in and do not litter.
- Respect and protect the historic structures.
- Do not enter closed or unauthorized areas.
- In case of emergency, call 911.



Bring Water!

Weather in the crater is always hot. Hike with at least a liter of water.

Sunscreen and hat are recommended.

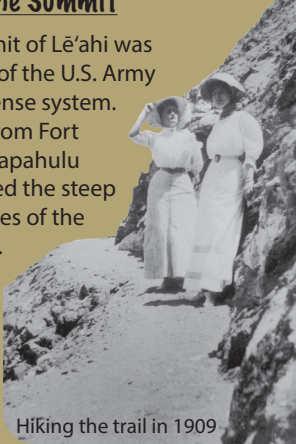


Points of Interest on the Trail

- 1 The elevation at the trailhead on the crater floor is about 200 feet (61 m).
- 2 The earthen berms visible from the walkway are the pistol ranges built in 1964.
- 3 The trail conforms to the 1908 alignment with switchbacks up the steep interior slope.
- 4 Concrete Landing/Lookout. This concrete foundation held a winch and cable that lifted materials from the crater floor to this point during construction at the summit.
- 5 Steep stairway of 74 concrete steps leads into the first narrow tunnel.
- 6 Tunnel is lighted and 225 feet long. Turn left at the end of the tunnel to the lookout.
- 7 Take in the view of the crater interior before continuing on the loop trail to the summit.
- 8 Lookout provides sweeping views of the southeastern O'ahu coastline including Koko Head, the offshore islands of Moloka'i, Lana'i and Maui, and Diamond Head Lighthouse.
- 9 Take the 85 metal stairs to the upper trail. From here, you see bunkers built in 1915 along the crater rim. AREA CLOSED - emergency helicopter landing.
- 10 The 54 metal stairs were installed in the 1970s and replaced the ladder within the Fire Control Station as the way to get to the summit and additional observation posts.
- 11 The elevation of the crater summit is 761 feet (232 m). This is the uppermost level of the Fire Control Station. This lookout provides a 360° view including Waikiki and Honolulu.
- 12 Go back down the metal stairs and turn right. Note the camouflage on the exterior of the Fire Control Station. Climb into the Fire Control Station through slits that were once covered with metal shutters. Look for the mounts that supported the observation equipment.
- 13 Go down the 52 steps of the lighted spiral staircase that provided access to the 4 levels of the Fire Control Station.
- 14 At the base of the stairs is a short tunnel that leads to the exit from the Fire Control Station.
- 15 The steep 99 stairs take you out of the Fire Control Station. At the base of the stairs, turn left and go back through the tunnel and down the trail.

Historic Trail to the Summit

The trail to the summit of Lē'ahi was built in 1908 as part of the U.S. Army Coastal Artillery defense system. Entering the crater from Fort Ruger through the Kapahulu Tunnel, the trail scaled the steep interior western slopes of the crater to the summit. The narrow dirt trail with numerous switchbacks was designed for mule and foot traffic. The mules hauled materials on this trail for the construction of Fire Control Station Diamond Head located at the summit. Other materials were hoisted from the crater floor by a winch and cable to a midway point along the trail. A tunnel was excavated to connect the trail and the Fire Control Station. When the trail was completed, it was described as being "built of dust and ash without a sprig of anything to catch hold of . . . it was a nightmare!" The railings were added soon after.



Hiking the trail in 1909

U.S. Army Museum of Hawai'i



Using mules to build Fort Ruger, 1910

Hawai'i State Archives